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ABSTRACT

The aim of this paper is to outline the lessons learned in helping academics at the University of Strathclyde (Scotland) to bridge the skills gap for their future teaching and learning. The University has recently implemented an initiative to promote good practice in the development and use of new learning technologies to enhance teaching and learning. The paper explores how concerns voiced by academic staff were instrumental in developing strategies to overcome conceptual barriers to the use of the Internet technology. This was achieved during the implementation of a skills development program at the University. This program included workshops exploring pedagogical and practical issues, skills development instruction for faculty via the World Wide Web, the creation of a community of scholars, and providing consultancy to individual departments. The metaphor of the Clyde Virtual University provided a conceptual framework on which academics could discuss and develop pedagogical issues. (Author/AEF)

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Overcoming Conceptual Barriers to the Use of Internet Technology in University Education

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Abstract:

Recent government legislation has led to an upsurge in interest and debate over the use of Internet technology in university education. But how are academic staff being supported through this minefield of change? The aim of this paper is to outline the lessons learned in helping academics at the University of Strathclyde to bridge the skills gap for their future teaching and learning. The University has recently implemented an initiative to promote good practice in the development and use of new learning technologies to enhance teaching and learning. This paper explores how concerns voiced by academic staff were instrumental in developing strategies to overcome conceptual barriers to the use of Internet technology. This was achieved during the implementation of a skills development program at the University. This program includes workshops exploring pedagogical and practical issues, teaching skills development to faculty via the web, the creation of a community of scholars and providing consultancy to individual departments. The metaphor of the Clyde Virtual University *(http://cvu.strath.ac.uk/)* provided a conceptual framework on which academics could discuss and develop pedagogical issues.

1. Background

The potential for a major culture shift from traditional ways of educating students has been made possible by Internet-based teaching and learning methods, and further encouraged by government, university management and the expectations of students. For academics already struggling to keep up with increased administrative demands, teaching loads and research pressures, learning technology can be a formidable, time-consuming area to further sap their limited energies. At the University of Strathclyde in Glasgow, Scotland, faculty are involved in a program of skills redevelopment aimed at increasing the use of Internet technology in teaching and learning. The intention of this paper is to outline the successes and limitations of providing a skills development program at the University of Strathclyde. Based on our recent staff and educational development experiences we will discuss:

- skills development program - how Learning Technology courses were facilitated at the University of Strathclyde,
- barriers to using web-based technology voiced by participants on the courses,
- developing strategies to overcome these barriers,
- providing skills development to faculty via the web itself,
- future development - strategies required to increase the use of learning technologies in Higher education

2. Skills development program

Each workshop in this program is constructed around the learning environment of a virtual university. This provides a conceptual framework for academics to develop and use new learning technologies to enhance their own teaching and learning. The skills development program at the University of Strathclyde aims to promote good practice in the development and use of new learning technologies.

This is achieved by:

- running a program of skills development workshops,
- promoting dialogue through meetings and special events,

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- providing individual consultancy to departments and providing resources to help academics use new learning technologies.

The program was piloted in the first semester of the 97/98 academic year and includes courses in:

- Choosing the Right Technology
- Electronic Assessment
- Web-based Teaching
- Electronic Libraries and
- Internet Communication.

These are usually full day workshops which are designed to complement one another, though this is not the sole focus. Faculty are initially invited to examine some of the educational issues involved in using the Internet for teaching and learning. Case studies are presented to illustrate these issues, showing examples of good practice where new technologies have truly enhanced teaching and learning. Wherever possible web-based materials, assessments and communication methods are used by academics themselves, placing them temporarily in the role of students and enabling them to evaluate the technologies at first hand.

Though practical training in the use of learning technology is provided to faculty during the classes, the focus is on the teaching and learning potential rather than on the technological potential. Staff are continually invited through the use of face to face and electronic discussions to think about how the technologies would best be used to enhance the student learning experience. Finally, through the workshops, academics are made aware of the various national and local services which are available to assist them in integrating the technologies into their teaching and learning.

3. Barriers to using web-based technologies

All classes are evaluated by anonymous online evaluation forms which allow the developers of the training program to assess its usefulness and to change the format and content in response to new requirements. From these forms and in class discussions we have developed a clearer picture of the perceived barriers to using new learning technologies. Some staff have expressed concerns about the lack of a suitable technical and organisational infrastructure for the implementation of these technologies; these can be relayed by the course organisers to senior management. Other barriers to the adoption of these technologies which the workshops aim to address include technophobia and a fear of dramatic increases in workloads. Furthermore, prior experience with educational technologies such as some CD-ROM packages has led to a cynicism among some staff about the educational effectiveness and the feasibility of implementing electronic teaching and learning on a large scale, though the potential of the web re-enthuses disillusioned participants.

Many of the reservations academic staff have about the new technologies were anticipated and dealt with during classes before they were voiced. For example, electronic assessment involving multiple choice type questions is often unsuitable for summative examination as Multiple Choice Questions fail to assess "deep" learning. Encouragement to students to communicate with their lecturers electronically can result in increased administration. Can the lecturers recommend new technologies to their students when they cannot provide personal, technical and administrative support?

Finally, some academics have limited conceptions about the use of the Internet for teaching and learning in advance of attending the program. They perceive that they might wish to put their lecture notes online and have no notion of a pedagogical basis for doing so. Perhaps they would like to recommend to students the use of the web as a resource for performing literature searches or to encourage limited dialogue by email. However, there is often no real conceptual framework of a learning environment on which to base their use of the WWW in teaching and learning. There is a degree of naivety with respect to new learning technology curing all of the perceived problems associated with traditional teaching and learning. If some academics have a poor grasp of pedagogical issues it is unlikely that they will overcome this simply by using different teaching methods.

3.1 Developing strategies to overcoming these barriers

At the University of Strathclyde, we perceived our skills development program as an excellent opportunity to overcome barriers to the adoption of the Internet for teaching and learning. This was achieved by using the metaphor of the Clyde Virtual University (CVU)1. The CVU is a virtual learning environment which integrates the main components of a traditional university setting. The Lecture Theatre is a home for web-based teaching materials, while the Library contains additional mainly textual resources. Students register for courses and find out about the virtual university in the Administration Office and take part in online discussions and virtual tutorial groups in the Virtual Café. Formative and summative assessments are found in the Assessment Hall. The simplicity of this model has found favour with academic staff throughout universities in the West of Scotland for whom assistance is provided in setting up web-based courses on CVU by project staff. Academics are able to review the learning packages, assessments and discussions groups currently delivered from the virtual university in their own and other subject areas before creating new materials.

The staff development workshops are designed around the conceptual framework of the Clyde Virtual University. Not only does this present academics with the notion of an integrated virtual learning environment, but it also provides them with an infrastructure to aid them in the construction of learning materials. The aim is to render the technology as transparent as possible so that focus can be placed on learning issues. Each workshop begins with a discussion of pedagogical issues, such as evaluating collaborative technologies [Sclater et al. 1998] or accommodating differing learning styles [Badcock et al. 1996]. In our experience academics can easily acquire practical skills such as creating online learning material using Netscape Composer. Using the CVU Test Wizard to integrate this primary course material with formative assessment and incorporating a HyperNews discussion in the Virtual Café adds a further dimension.

One of the workshops entitled Choosing the Right Technology provides an introduction to the other courses and gives faculty an overview of the learning technologies available to them. A major concern voiced was that existing materials, such as educational CD-Roms, promote surface learning. This is addressed by examining ways in which these materials can be integrated into the existing curriculum and, combined with more traditional, paper-based methods, can enhance teaching and learning. Some research behind the successes and pitfalls of integration has been documented by LTDI [LTDI Publications 1997], and is highlighted during a short on-line course. Staff have expressed that they enjoy being in the role of a student whilst reflecting on ways in which they could integrate the use of learning technologies into their own classes.

The significance of student dialogue was highlighted in a recent article by Terry Mayes in The Times' Higher Education Supplement [Mayes 1997]. Professor Mayes argues that it is essential to establish two-way communication: from teacher to student, then from student back to the teacher with the teaching giving effective feedback. Professor Mayes argues that current use of learning technology facilitates only one-way communication: from teacher to student. In the workshop on Internet Communication the importance of two-way dialogue is discussed with staff from both the University of Strathclyde and the Glasgow Caledonian University via a wide range of technologies including text conferencing, Internet Relay Chat, videoconferencing and shared whiteboards. Case studies have been very effective in illustrating innovative teaching methods. Two examples are the ICON Project [see Sclater et. al., 1998] during which students collaborated on a design project via the local Metropolitan Area Network and NetSem [Duffy et al. 1995] which was a music seminar carried out over the Internet.

The workshop focussing on Electronic Assessment has been made effective by blending pedagogical and practical skills. Participants discuss the most effective uses of electronic assessment in their classes, for example for formative assessment of large numbers of students. Focused on an effective use, participants can then utilise the assessment (*http://dora.cc.strath.ac.uk/david/work/ae/design/*) developed by the Clyde Virtual University team which enables them to rapidly create assessments even if they have very limited technological knowledge.

The Web Based Teaching workshop draws together skills required for web based course development with the practical issues of creating web pages. Academics are asked to bring some teaching material which they wish their students to use via the Clyde Virtual University. Despite their limited IT skills, most participants seem amazed at how quickly and easily they can create web pages. This allows them to concentrate on the underlying pedagogy. Increased use of the Clyde Virtual University means that there are even more educational websites with ideas to explore. A lecturer interested in putting teaching materials on the web may come away with an enthusiasm for developing assessment to be held in the

Assessment Hall. The realisation that the web can be used dynamically for discussions in the Virtual Café can transform an otherwise uninspiring series of online lecture notes placed in the Lecture Theatre.

As lecturers adopt more of the technologies into their teaching, the conceptual framework changes from that of a collection of isolated discussions, assessments and lecture notes. Courses can evolve into fully integrated learning environments with materials, activities, formative assessments, lists of frequently asked questions, discussions and summative assessments available from a single front end based on the course itself rather split up into the various areas of the virtual university.

3.2 Providing training courses to faculty via the web

One such course can be found in the CVU Lecture Theatre. Aimed at faculty within the University as well as undergraduate and postgraduate students, Advanced WWW Authoring allows participants to become proficient in using features of HTML such as frames and tables, as well as dabbling with simple JavaScript. This course can be taken by registered users of Clyde Virtual University as a stand-alone module but is also delivered as part of the staff development program at set times. Many staff, though able to take the course from their own desk, prefer to attend the scheduled class. Away from the distractions of their normal working environment, they can fully immerse themselves in the course with a limited amount of assistance from the course tutor and fellow participants if required.

The web-delivered course is introduced by the course tutor who ensures that participants have the basic computer and HTML authoring skills necessary to work through the materials. A recurring problem is the arrival of staff and students who have attended a previously scheduled course in basic web authoring but had no chance to practise their new skills. They are referred to online revision materials if this is the case. Some participants also have difficulty in adjusting to a course based entirely on the web and take some time to become familiar with the mode of study. There is a requirement to have three windows open simultaneously: the course itself in a web browser, a text editor enabling the entry of HTML and a secondary web browser to test the created web pages. A few less computer literate users have requested paper versions of the course materials; others have no difficulty toggling between the three windows.

Once satisfied that the participants are able to use the course, the tutor returns to his desk to work on other matters. From time to time, emails arrive in the tutor's inbox giving the results of the online assessments course participants are taking at the end of each chapter. Comments made in the course discussion forum also come in sporadically during the day. The tutor is thus able to build up a picture of how the participants are progressing with a minimum of attention. Later he returns to the lab to help users with problems they have not been able to solve for themselves. These problems are becoming fewer as groups of students highlight problems with the course which can be put right before its next scheduled delivery.

Online evaluation forms sent to the tutor at the end of this course confirm that most faculty are comfortable working in this way, though it is important to make clear to them at the start that the tutor is not going to be physically present for much of the day! Most participants check a box stating that they prefer a tutor to be around for some of the time rather than doing the course in complete isolation. Practical exercises throughout the course are rated highly, while quizzes at the end of each chapter are thought to be reasonably useful. Most users do not take part in the Hypernews discussions for each chapter and the general consensus is that these are not particularly useful. For the tutor, such comments as there are enable inadequacies in the course to be resolved. All users have commented that they would like to take future courses in this way; it is likely that we will develop further online courses and teach larger parts of the scheduled skills development classes via the web.

5. Future developments

Instead of a static and uninspiring medium for presenting text-based materials, courses designed for the virtual university can enhance communication between lecturers and students and between the students themselves. The need for dialogue and feedback as an essential part of the learning process is often lacking in existing teaching methods [Mayes et al. 1995], so this issue is stressed to staff attending the courses. The dialogue continuously encouraged during the workshops themselves provides opportunities for lecturing staff to experience the positive effect of two-way communication on the learning process.

Recent evaluation studies have shown that increasing numbers of academics are preparing to use new learning technologies to enhance their teaching and learning. The skills development program is only one of a series of initiatives, outlined earlier, to equip academics for this task. They have expressed a need to be supported by central services such as Academic Practice, Educational Systems and Audio Visual.

There is also an essential requirement to develop a community of scholars actively using these technologies. It is essential to retain the momentum and enthusiasm kindled during the workshops by promoting dialogue, debate and discussion. Therefore, after completion of a workshop participants are invited to add their names to a mailing list advertising meetings and special events. These include discussions of innovative methods of teaching and learning and seminars by visiting academics.

Another fundamental component of supporting academics wishing to use new learning technologies is to provide consultancy to individual departments. Presently at the University of Strathclyde many departments are developing strategies for implementing innovative methods of teaching, whilst some have secured funding for specific projects. It is important to offer informed guidance whilst embracing the individuality of each department.

As new communication technologies become widespread, it will be increasingly important for academics to have a clear understanding of teaching and learning issues and to acquire the necessary skills [Stefani et al. 1998]. To this end we are currently developing a Post Graduate Diploma in Advanced Academic Studies which includes two modules (at Scottish Masters level) in Web Based Teaching and Internet Communication. We hope to draw upon the lessons we have learned and further support academics to bridge the skills gap for their future teaching and learning.

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